

bel canto

e.One™ series

FM1



USER'S GUIDE

FM1

FM Digital Tuner

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Bel Canto Design Limited
221 North 1st Street
Minneapolis, MN 55401
United States

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Important Safety Instructions

Explanation of symbols used in this manual or on the rear/underside of the apparatus:



The Lightning Flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

- Read, keep and follow these instructions.
- Heed all warnings.
- Do not use the apparatus near water, ie near a bathtub, kitchen sink, laundry tub, in a wet basement, near a swimming pool etc.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the Manufacturer's instructions. Site the apparatus so that its location or position does not interfere with its proper ventilation. For example, the apparatus should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings, or placed in a built in installation such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
- Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet; consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and at the point where they exit from the apparatus.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug has been damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Mains plug: Use the mains plug to disconnect the apparatus from the mains supply. The mains plug must be accessible at all times. Use the mains switch (if applicable) when the apparatus is not in use.
- Objects and liquid entry: Do not let objects or liquids fall into the apparatus. Do not expose the apparatus to dripping or splashing. Do not place a vessel containing liquid on top of the apparatus.
- No naked flame sources, such as lighted candles, should be placed on the apparatus.
- The apparatus has been designed for use in moderate and tropical climates.

TO COMPLETELY DISCONNECT THIS APPARATUS FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE.

THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY ACCESSIBLE.

Disconnect supply cord before changing fuse.
Refer servicing to qualified service personnel.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE AND OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHOULD NOT BE PLACED ON THIS APPARATUS.

In The U.K.

Fuse replacement:

This appliance is fitted with a non-rewireable 10 amp mains plug. The plug contains a 10 amp fuse. If the fuse has blown it can be replaced as follows:

- Pull out the black fuse cover/carrier.
- Remove and dispose of the blown fuse.
- Fit a new 10 amp BS1362 approved fuse into the carrier and push the carrier back into the plug.

Always ensure the fuse cover is fitted. If the fuse cover is missing do not use the plug. Contact your Bel Canto retailer to obtain a replacement fuse cover. Fuses are for fire protection and do not protect against electric shock.



WARNING: THIS APPLIANCE MUST BE GROUNDED.

FCC NOTICE

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does

cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Green By Design

All Bel Canto products make use of compact and efficient design principles. Our products use less resources per unit to produce better performance than ever before. Everything from reduced packaging volume, to less weight in transport helps to reduce the overall environmental impact of bringing our products into the market.

Our products make very efficient use of electricity. Low energy usage and compact size ensure that the physical and environmental footprints of all Bel Canto products are minimized. Quality and performance play into this approach as all of our products are designed to remain vital and valid performers for many years. Should you want to upgrade to one of our new products, we even offer trade-in value for your old Bel Canto product to ensure that it is recycled in the most efficient and responsible manner.

RoHS and WEEE

All of our current products are designed and produced to RoHS standards, ensuring that dangerous materials do not enter the waste stream. Lead free electronics assemblies and environmentally safe finishing and production methods are utilized to ensure that our products and processes are environmentally safe.

Bel Canto Recycles

Bel Canto has always been a forward thinking company. In the same way that we are focused on the development of high-end audio products, we are also conscious of what we leave behind. For many years we have implemented environmentally sound measures to make the most efficient use of resources and keep our impact at a minimum.

We reuse or recycle more than 99% of the packing materials for our incoming parts shipments. Each year we divert massive amounts of cardboard, paper, plastic film, and Styrofoam from landfills. Our plastic and Styrofoam is delivered directly to local facilities that process it on site for use in their manufacturing. Steel, aluminum, and other metal waste products are delivered to local metal scrap yards for recycling back into the production stream.

We also participate in Waste Management's e-Cycling program. All electronic waste is processed in the US, with hazardous material being separated from non-hazardous, at ISO 9001 and ISO 14001 certified regional processing centers.

Our commitment to responsible production processes ensures that the absolute minimum of material used in the making of our products enters the waste stream.

Warranty Information

Bel Canto products are automatically covered by a 90 day factory warranty that covers all internal parts and labor. Register online (http://www.belcantodesign.com/Belcanto_Warranty.html) within 30 days of purchase from an authorized dealer to automatically extend your warranty for 2 years starting from the date of purchase. If you do not have web access, please contact your dealer for assistance. Upon fully completing registration, within 5 business days you will receive an email that officially validates your warranty. Your information will be used for internal use only and will not be sold or released outside Bel Canto. Your comments and suggestions are appreciated and help us continually improve our products and services.

The warranty is only valid to the original owner and is non-transferable. Damage caused by unauthorized modification, abuse, or neglect of product will void your warranty. Any cost associated with return of product is the sole responsibility of the owner. All returns require a return authorization number issued after completing the RMA form in the support section of our website. If you have any questions, please feel free to contact us online at info@belcantodesign.com.

Unpacking Your FM1

FM1 packaging contains the following:

- 1 (one) – FM1 Tuner
- 1 (one) – User's Guide
- 1 (one) – Desktop Power Supply and Power Cord
- 1 (one) – Wire Antenna
- 1 (one) – Remote Control

Carefully unpack each piece and check for shipping damage. If there is any damage, or if anything is missing, please contact your dealer, distributor or Bel Canto Design.

IMPORTANT: Save all packing materials as they are specially designed to protect the unit during transportation or shipping. If the packing becomes lost or damaged, please contact your dealer, distributor or Bel Canto before attempting to transport your unit.

Power Connection

The power supply on the FM1 is preset for the proper power voltage. The power cable should have the correct plug for your local power system. If you believe this to not be true, please contact your dealer immediately.

This product, like any electrical component, can be dangerous and cause injury unless correct handling procedures are observed and used. Before powering this product, it is necessary to read and follow proper setup and procedures.



WARNING!

Do not connect power to this product yet!

Setup & Placement

Because the FM1 runs cool, it can be placed in many system locations without compromise. We do not recommend placing weights or other objects directly on the FM1. This may scratch or mar the chassis finish. Do not use harsh chemicals when cleaning the outside of your FM1.

Single Ended RCA and Balanced XLR connectors are available. XLR jacks allow balanced hookup using the standard North American pin configuration:

Pin 1 Ground
Pin 2 Signal +
Pin 3 Signal -



IMPORTANT!

Make all connections before powering your unit!

Design Features

Features:

- Patented Digital IF analog FM tuner front end
- 24/96 digital outputs
- High Dynamic Range 24/192 DAC analog section
- RDS/RDBS Function
- 8 Digit Alphanumeric Green LED Display
- 10 Station Presets

The Bel Canto FM1 uses a patented analog FM receiver architecture, the FM1 delivers superior RF performance and interference rejection through the use of digital IF processing. The FM1 includes advanced seek algorithms, adjustable soft mute, auto-calibrated digital tuning, and FM stereo processing. The FM1 utilizes digital processing to achieve high fidelity and optimal performance, providing excellent pilot rejection, selectivity, and unmatched audio performance. This DSP approach also ensures zero drift and optimum performance for the life of the product. The advanced digital IF section operates at 24 bit 48 Ks/s data rate. This digital output can be interfaced to a Bel Canto DAC product for D/A conversion or is converted to analog using the internal High Dynamic Range Bel Canto DAC architecture. The FM1 uses Bel Canto's Ultra-Clock low jitter clock and 122dB dynamic range DAC to deliver superb analog output performance.

The FM1 also incorporates a digital processor for the European Radio Data System (RDS) and the North American Radio Broadcast Data System (RBDS). Using this feature, the FM1 enables broadcast data such as station identification and song name to be displayed on the 8 digit alphanumeric display. The FM1 provides unprecedented functionality and performance in a compact easy to use package and is a perfect complement to a complete Bel Canto DAC or Preamp based system.

The FM1 should be set for correct operation for European, North American and Japanese FM standards. The internal setting is indicated by the presence of a suffix on the Firmware Rev number: **U** for USA, **E** for European and **J** for Japanese settings. If your tuner setting does not match your region, both tuner operation and performance will be seriously affected. If you do not have the correct region code, please contact your Bel Canto Dealer or Distributor.

Single Knob Control Functions & Display

Front Panel Control Knob:

The control knob is a continuously rotating control with a push-switch function. Always push the button with your finger in the direct center of the knob.



Rotate the knob to tune up or down the FM dial. Note that inter-station noise will be muted. Only stations with signals above the mute threshold will be present.

Pushing the knob will switch between three different display modes:

01. FM or Preset, whether the signal is in stereo (M for Mono, B for Blend and S for Stereo), and the station call number.
02. RDB/RDBS Display
03. RSSI Display in dBuV: Values above 40dBuV will result in full stereo separation.

Upon Power Up:

When switched on, the FM1 will perform its startup sequence followed by displaying the firmware revision. The FM1 will be set for one particular world region, notated by one of three letters after the firmware revision: **U** for US, **E** for Europe, **J** for Japan.



Display Modes:

The FM1 will then go to Standard mode. This displays either FM or the Preset number on the left, presence of the stereo carrier, whether the signal is in stereo (**S** for full stereo, **B** for stereo blend, and **M** for mono signal), and the tuned frequency. The decimal to the right of the FM or Preset display indicates the presence of the Stereo Carrier on the station. This character will flash **R** if that station is transmitting RDS. Rotate the control knob to discreetly select the frequency.



standard display mode, non-preset

CONDITIONING

The sonic performance of the FM1 will begin to stabilize after 100 hours of continuous power up.

Remote Control

Tuner: To access all functions of the Tuner, this button must be selected

Mute (remote only): The FM1 is a fixed output device. The Mute button will punch through to your Bel Canto DAC or PRE.

Display: Toggles through several display options:

1. Standard: displays FM or Preset number on the left, whether the signal is in stereo (**S** for full stereo, **B** for stereo blend, and **M** for mono signal), and the tuned frequency. This character will flash **R** if that station is transmitting RDS.
2. RDS Mode: *Radio Data Signal*, when available, this scrolls station, song, and/or artist across the display. Note that RDS screen will show NO RDS until RDS data is received from the station (indicated by the flashing **R**.) The RDS function is entirely the station sending the RDS data. Sometimes this data is not present from a given station.

There are 2 modes of RDS/RDBS function:

- 1) Radio Text: this is the first RDS screen in the display rotation. When there is no data then NO RT will be displayed.
- 2) Program Services: this is the second RDS screen in the display rotation. When there is no data then NO PS will be displayed.

Depending on the radio station, there may be similar or quite different information displayed in each case. Note that the RT scrolls and the PS are displayed in 8 character segments.

BEATLES

3. RSSI: *Received Signal Strength Indicator*, on a scale of 1-100, over 40 is necessary for a good stereo signal. Less than 40 will be a stereo blend (**B**) or mono (**M**) signal.

RSSI 42

4. Product Name: FM 1
5. Software Version: displays revision of software and region code
6. Display Off: using the remote or the knob control will turn the display back on for 3 seconds.

Volume +, Volume -: The FM1 is a fixed output device. Volume control punches through to your Bel Canto volume controlling unit (such as a DAC or PRE), increasing (+) and decreasing (-) the volume. Buttons can be pressed multiple times or held to scroll volume up and down.

Presets: The FM1 can have up to 10 presets which are noted as P0 – P9 on the display. To program each preset, hold the number button on the remote for 2 seconds while tuned in to the desired frequency. (For Preset 1, hold the 1 button, etc). To recall the preset, simply press the number button again.

P7 S 99.5

<<, >>: Discreet tuning through the entire frequency band. Hold either button for continuous tuning in a particular direction.

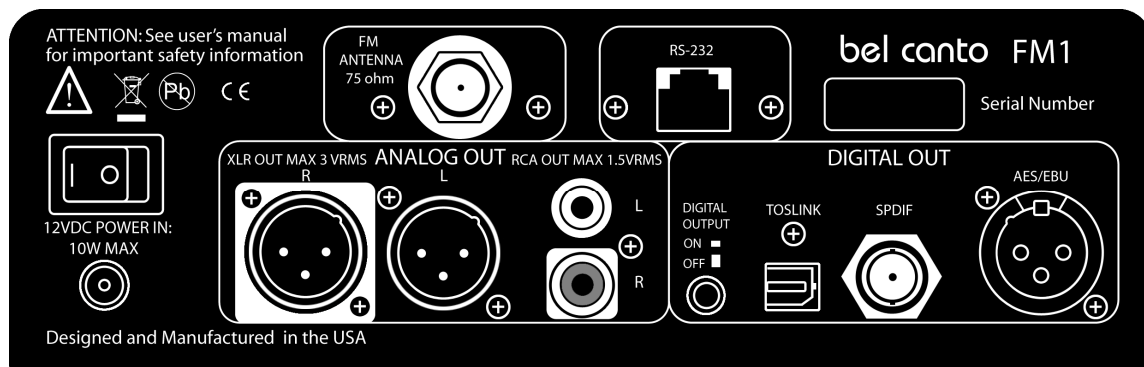
[<<, >>]: Choose a preset station by going in numerical value of the preset in either direction.

CH/SCAN – or +: Channel scan to the next strongest signal

Mono: The FM1 can be forced into Mono Mode as desired if the noise level for a given station is not acceptable. Pressing the Mono button again will return to normal Auto Stereo or Blend operation. When changing to a new preset or tuning a new station the Mono Mode will be reset to Auto Mode



Rear Panel Connections



- Power switch
- 12 VDC Power Jack for connection to table top power supply, LNS1, or VBS1.
- 75 ohm coaxial F-type antenna connection (*Read below regarding your antenna*)
- RS-232 control port
- XLR 3 Vrms or RCA 1.5 Vrms analog outputs for driving a preamplifier
- Digital Output toggles digital outputs ON or OFF. Press the button IN to allow the digital outputs to function. If the digital outputs are not used into an external DAC or processor then it is recommended to turn the digital outputs off. The internal DAC will then operate at 24/192 data rate for optimum sound quality.
- TOSLINK output accepts any standard plastic or glass fiber optical TOSLINK cable and operates to 24/96 data rate
- SPDIF 75 ohm Output at 24/96 data rate
- AES/EBU 110 ohm output at 24/96 data rate

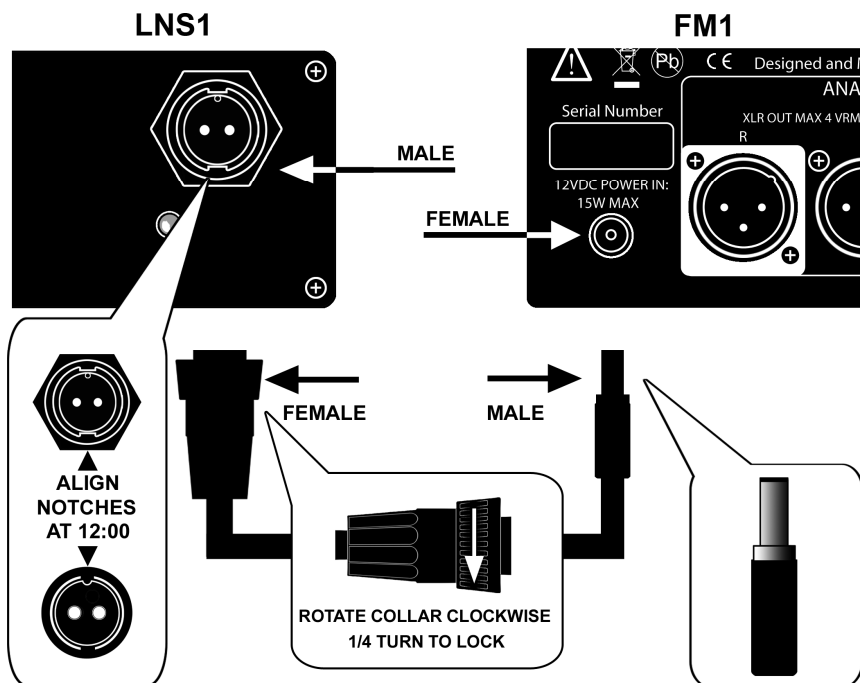
Choosing Your Antenna

The quality of your FM Antenna and the location and connection of the antenna are critical to the quality of the audio that you will get from any FM tuner. The supplied antenna wire is only intended as a quick way to check the correct hookup and operation of the FM1 but should NOT be used for critical evaluation of the FM1 performance. **It is important that you work with your dealer in choosing and setting up the correct 75 ohm FM antenna for your reception area and needs.**

There are 3 points to pay attention to:

- 1) Choose the best FM only antenna that you can afford and accommodate in your location. Good results can be had in urban areas using a directional indoor antenna but in rural areas where station strength may be low it could well be necessary to install a good quality Yagi directional antenna that is sited to receive your favorite radio stations. There are many sources of good FM antennas for example: <http://www.fmdxantenna.com> has a good selection of both indoor and outdoor antennas that should work well. Beware of the cheap 'active' gain antennas from various sources as they often just add noise and distortion to the signal and do not really improve reception.
- 2) Use the correct 75 ohm coaxial cabling to connect from the antenna to the FM1. RG6 type coax is the best for cable runs over 75-100 feet while RG59/U type cable can be used for shorter runs. In any case make sure that the terminations and connections are clean and tight for reliable operation.
- 3) Any outdoor antenna should be installed by a professional to make sure that the correct safety precautions are taken to protect you and your equipment.

Connecting The LNS1



- Besides the included power supply, the FM1 may be powered by either the VBS1 or the LNS1. If using the VBS1, please refer to the VBS1 User's Guide for connectivity. If using the LNS1, please read the following
- The LNS1 is designed to power Bel Canto VB equipped products only. Use of any cable other than the supplied power interconnect may damage either the LNS1 or VB equipped unit and will void any warranty. Certain non-VB equipped units can be factory upgraded. To begin the upgrade process, fill out the RMA form in the Support Section of our website
- When connecting your VB unit to the LNS1, be careful to observe the alignment notches on both units power receptacles and the power interconnect cable
- When inserting the power interconnect cable, align the notch on the cable end and the alignment teeth on the outer sleeve to the 12 o'clock position. This will allow the interconnect cable to fully seat and ensure that the plug mates correctly with the power receptacle
- Once the power interconnect cable is fully seated in the receptacle, lock in the power interconnect cable by turning the outer sleeve clockwise one quarter turn. Proper seating of the LNS1 cable will ensure safe and secure operation of the LNS1 and all connected components
- The LNS1 has been designed to run on non-regulated, non-filtered AC Mains. Usage of any additional isolation or filtration from the AC Mains supply may compromise LNS1 performance

Specifications

FM Section:

Input Frequency Range:	76-108 MHz
Sensitivity with 75 ohm input:	1.1uV EMF (S+N)/N=26dB
Input IP3:	105 dBuV $ f_2 - f_1 > 1 \text{ MHz}; f_0 = 2 \times f_1 - f_2$
Adjacent Channel Selectivity:	50 dB +/- 200KHz
Alternate Channel Selectivity:	70 dB +/- 400KHz
Frequency Response:	30Hz-15Khz -3dB
S/N:	>63dB
THD:	<0.1%

Analog 24/192 DAC Section:

Maximum Output:	3Vrms balanced XLR, 1.5Vrms RCA
Output Impedance:	200 ohms balanced XLR, 100 ohms RCA
Frequency Response:	20 Hz-20KHz, +/- 0.5dB
THD+N:	<0.0015%, 3Vrms balanced out, 1KHz
Output Noise:	3.3uVrms, A-weighted 20Hz-20KHz
Dynamic Range:	119dB, A-weighted 20Hz-20KHz

Digital Output Section:

Digital Output Rate:	24bits/96Ks/s
Digital Output Levels:	110 ohm AES/EBU 3Vp-p, 75 ohm SPDIF 1Vp-p, Toslink

General:

Station Presets:	10
Power Input:	12VDC, 0.5A
Power Usage On:	6W
Power Usage Off:	0.0W
Dimensions:	8.5 x 3.5 x 12[inches], 216 x 88 x 305[mm] (WxHxD)
Weight:	13lbs, 6.5Kg

Declaration Of Conformity

Application of Council Directive(s):

2004/108/EC and 2006/95/EC, as amended

Standard(s) to Which Conformity Is Declared:

EN 55013:2001 + A1:2003 + A2:2006

EN 55020:2007

EN 61000-3-2:2006

EN 61000-3-3:1995 + A1:2001 + A2:2005

EN 60065:2002/A12:2011

Manufacturer:

Bel Canto Design, Ltd.

221 1st Street North

Minneapolis, MN 55401 USA

The equipment identified here conforms to the Directive(s) and Standard(s) specified above.

Type of Equipment: FM Tuner

Models: FM1

Date: January, 2012

Bel Canto Design, Ltd.

221 1st Street North

Minneapolis, MN 55401 USA

Tel: 612-317-4550

Fax: 612-359-9358

Bel Canto Design, LTD
221 First Street North, Suite 300
Minneapolis, MN 55401
Phone : 612.317.4550 Fax : 612.359.9358
www.belcantodesign.com
info@belcantodesign.com
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version 4.0